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When Do Red Flour Beetles Fly?

By Joel Perez-Mendoza, Technical and Training Director, Schendel Pest Services, Topeka, Kansas

When insect resources become scarce and their populations increase, only dispersal to new habitats ensures possible insect population survival. In fact, the ability of the red flour beetle (*Tribolium castaneum* [Herbst]) to disperse by flight and colonize new food supplies has contributed to its status as a costly economic pest throughout the world.*

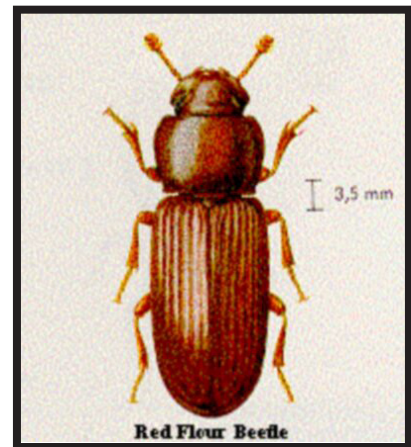
Factors that trigger flight behavior

Typical flight activity. Male and female red flour beetle adults normally can fly 48 hours after adult emergence. Newly emerged females (two to 10 days old) tend to fly more than newly emerged males, suggesting that males initially prefer to stay in the breeding media, waiting to mate with freshly emerged virgin females. After this period of time, the flight behavior of both males and females tend to be similar.

Contrary to other stored-product pests, whose optimum chronological age range for flight activity is between the first two to five days (e.g., lesser grain borer) or four to 32 days (e.g., larger grain borer) after adult emergence, red flour beetle adults are able to fly during their entire life span. However, their maximum peak of flight

activity occurs in relatively young adults, and mated males and females tend to fly more than virgin ones.

Food supply. The amount and quality of food in the environment has a high influence on flight. Red flour beetle adults with plenty of food for oviposition and larval development are less likely to fly, but when food is absent or scarce, flight is their predominant behavior.



Therefore, reproductively active adult beetles in food and processed grain storages respond to depleting resources at the end of the storage season by flying to new environments where resources are better for reproduction. These new environments may be located within the

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same facility or at other facilities.

Temperature and light. Temperature and photoperiod (light) trigger flight in numerous insect species. Generally, temperature affects the number of insects flying, while photoperiod influences the time of flight.

Red flour beetles rarely fly when temperatures are below 20C (68F). The optimal temperatures for flying in this species range from 25 to 35C (77 to 95F), but flight can occur even at 40C (104F).

Photoperiod doesn't have a big influence on the flying behavior of red flour beetles because adult activity occurs at every hour of the day and night, with more flight activity typically observed at dusk.

Practical implications

The role of male-produced aggregation pheromones may be to congregate males and females at a new suitable food resource. Thus, we can expect that the insects caught by aerial pheromone-baited traps are most likely to be active young beetles seeking new food resources to infest.

In contrast, the absence of red flour beetles in a monitoring trap, when red flour beetles are present, could indicate that sufficient food resources are available. Similarly, not seeing red flour beetles flying, when large numbers of beetles are present in terrestrial pheromone-baited traps and all other factors are favorable for flight, may also indicate that sufficient food resources are available.

Certainly, this research raises some questions on the value of visual inspection and flour beetle monitoring traps. For example, capturing red flour beetles on or off the floor may mean that sanitation programs are working. Captures may also be a trigger for implementing pest management strategies to prevent infestation of uninfested products by this pest.

*The information provided in this article is part of a research project conducted by the article's author Joel Perez-Mendoza, James E. Throne, James E. Campbell and Paul Flinn at the USDA-Grain Marketing Production & Research Center (GMPRC). Their goal was to determine the importance of various flight stimuli to find out when red flour beetles fly.



An Auditor's View

By Jami Guenther, Quality Assurance Director, McCall Services, Tampa, Florida

For pest management companies, providing top-notch quality and service allows them to stand out from other companies. Since this is so important in maintaining satisfied customers, many companies are employing their own auditors to ensure they provide superior quality and services for their customers.

These auditors not only provide another set of eyes to verify that their clients are receiving top-notch service, they also make sure they have regular communication with their customers' management teams in an effort to develop and maintain a good relationship with their customers.

What do auditors do?

There are four different main areas that auditors explore when they audit an account. These include:

1. **One-on-one client interview.** The auditor will not only review what the company's technicians are doing for the ac-

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counts, but will also spend time talking with the client's upper management and others in the company to ensure they are satisfied with the work being performed. Auditors need to make sure that the client's management feels comfortable discussing any problems they have so the pest management company can take action to rectify problems before they escalate. Also, if there have been any emergency requests, the auditor reviews whether they were responded to in a timely manner and whether or not the problem has been resolved.

The auditor will also make sure management reviews the reports the technician completes because the report may cite sanitation or structural issues that should be addressed by the facility to aid in the facility's pest management.

2. Premises inspection. The auditor looks at the pest management equipment (e.g., ILTs) and makes sure that it meets the service protocol, that there is enough equipment, that it is the right type of equipment, that it is positioned for maximum effectiveness, and that the equipment is being serviced and cleaned properly. The auditor also looks for sanitation and structural issues that could cause pest problems at the facility.

3. Documentation review. The auditor will review the company's log book, which houses service reports, copies of the technicians' identification cards showing they are certified with the state, insurance papers, copies of labels and MSDSs for the products that are being used, and a copy of the current equipment map that shows where all of the equipment stations are located. This paperwork is important because if the company were ever taken to court, the court would review the log book. Third-party auditors also review the log books to ensure everything is complete and up to date.

In addition, the auditor reviews the technician's service reports to ensure the technician is documenting everything correctly and completely. If something isn't documented, then more than likely the facility's management wasn't told about it.

4. Pest activity inspection. During an inspection, the auditor will look for pests or any possible chances for contamination or regulatory action because of rodent or insect activity. If there is an issue or a potential issue, the auditor will send one of the company's technicians back to address it.

In addition to being technically

savvy in proper pest management and documentation, auditors need to be skilled communicators because they are the main liaison between the pest management company and the client, to ensure that the pest management company is performing quality work and the client remains satisfied for years to come.



Ant pest issues in healthcare and senior living facilities

By J.B. Howell, Technical Director and Entomologist, Holder's Pest Control, Houston, Texas, and Jan Schmidli, Copesan's Quality and Operations Field Support Specialist

When ant pests infest any facility, they are bound to cause numerous problems, but when they invade health care and senior living facilities – where lots of food, fluids and unsuspecting patients are waiting – they pose a host of additional, unique challenges.

In these environments, there are people who aren't fully coherent and in some cases are unresponsive. So if red imported fire ants, for example, invade the room of a person who is not responsive, these ants could repeatedly sting the patient, and the patient may not even realize that he or she is being stung. As a result, this person could be in mortal danger and unable to summon help.

In other cases, small-size ants, like Pharaoh ants, could develop large populations before patients with reduced vision even realize they are present and foraging throughout the room. Reduced motor skills also may cause many patients to frequently drop numerous crumbs on the floor, which will attract ants.

In addition, these facilities usually have a lot of fluids present, which range from IV fluids to bladder and

drooling problems. Pharaoh ants, for example, love fluids. This causes a problem because the ants might be attracted to a patient's fluids and carry bacteria and diseases to other patients as a result.



All ants aren't created equal

To rid a facility of ant pests, you first must properly identify the type of ant species you are trying to control. With some ants, you can use an insecticide and get good control, but with others baits are necessary.

For example, when dealing with Pharaoh ants, conventional repellent insecticides have proven to induce the ants to bud, or split into smaller sub-colonies, with minimal control. Since Pharaoh ants have multiple queens, if they detect something that threatens their colony, they will send out secondary reproductives to start a new colony, which allows the ants to spread throughout the facility.

Pharaoh ants also don't have structured nests like other ant

species do. Any dark, protected and moist spot can provide them with a nesting site. This includes areas like food cabinets, drain pipes, faucets, showerheads and houseplants. Since they can develop a colony in any area with a little moisture, they could have 20 different colonies in a bathroom-sized area.

Pharaoh ants also have a wide range of food preferences, which makes baiting success difficult. Within individual ant colonies, food preferences can change on a daily or seasonal basis. Therefore, the best baiting strategy could be to offer several different types of baits simultaneously. Treatment also will need to include multiple patient rooms so the ants don't simply relocate to non-treated areas.

Red imported fire ants, which are generally restricted to the Southern states, pose their own unique challenges. For example, to treat these ants it is best to move patients out of the room to do a thorough job. Unfortunately, some patients may only be able to be moved for a couple of hours or not at all.

This creates a problem because

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getting control of these ants is difficult, and repeated applications of liquid or granular residuals may be needed to eliminate the colony. Baits can also be used, but they are slower acting.

Then even when control is maintained inside, many facilities continue to draw these ants in. Some of these facilities have

fire ant mounds throughout their grounds so there is always a lot of ant pressure on the building. Many of the buildings also have moisture problems or are landscaped in a way that attracts the ants toward the building. Once the ants are inside the building, they usually have access to all the food they would ever need, which makes regular treatments neces-

sary in these cases.

Contact Copesan

If you don't want ants to make your facility their home, contact Copesan or your local Copesan Service Center to help prevent and reduce the number of these pests before problems result.



Information in this publication was researched and prepared by highly regarded experts within the pest management industry who are part of the Copesan Partnership. Copesan has more technical expertise located throughout North America than any other pest management firm. The IPM Update is a small sampling of the knowledge and expertise we provide to our clients.

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